- **Course Highlights**
  - Introduction
  - Regulations
  - Caltrans Requirements
    - Construction Procedure Directive – CPD
    - Caltrans Special Provisions and Handbooks
  - 303(d) Sedimentation / Siltation or Turbidity
  - **Non-Visible Pollutants**
  - Sampling and Analysis Plan Review Guidelines
  - Contractor Sample Collection Procedures
  - Inspection Tips

Non-Visible Pollutants

- **SAP**
  - **Applies:**
    - To projects where construction activities result in 0.4 hectares (1 acre) or more of soil disturbance and when there will be a storm water discharge directly to a Water of the United States (e.g. USGS blue line) or to a storm sewer system that discharges into a Water of the United States
    - Water of the U.S. defined go to www.epa.gov/region6/6en/w/watersus.htm

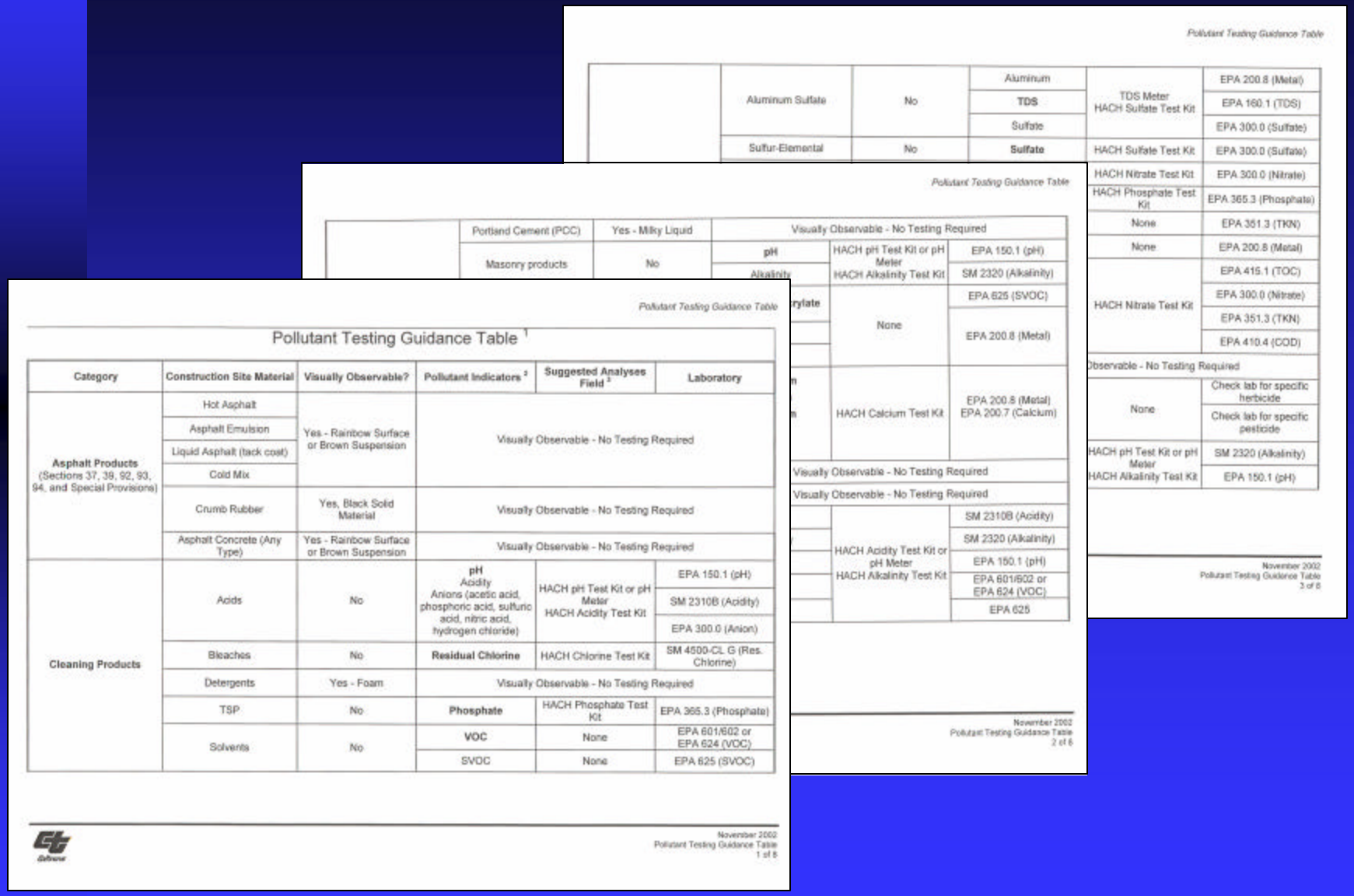
Non-Visible Pollutants

- **What are they?**
  - Pollutants, other than sediment, that are known or should be known to occur on construction sites that can't be seen in storm water discharges

- **How do I know if I have to sample for them?**
  - Use the pollutant testing guidance table

Examples: Asphalt Products, Cleaning products, Pesticides, fertilizers or soil amendments

Pollutant Testing Guidance Table



Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Asphalt Products (Sections 37, 39, 92, 93, 94, and Special Provisions)	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes, Black Solid Material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
Cleaning Products	Acids	No	pH Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	HACH pH Test Kit or pH Meter HACH Acidity Test Kit	EPA 150.1 (pH) SM 2310B (Acidity) EPA 300.0 (Anion)
	Bleaches	No	Residual Chlorine	HACH Chlorine Test Kit	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	Phosphate	HACH Phosphate Test Kit	EPA 365.3 (Phosphate)
	Solvents	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

Pollutant Testing Guidance Tables

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	HACH pH Test Kit or pH Meter HACH Acidity Test Kit	EPA 150.1 (pH) SM 2310B (Acidity) EPA 300.0 (Anion)
	Bleaches	No	**Residual Chlorine**	HACH Chlorine Test Kit	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	**Phosphate**	HACH Phosphate Test Kit	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

Notes:

1 If specific pollutant is known, analyze only for that specific pollutant. See MSDS to verify.

2 For each construction material, test for one of the pollutant indicators. **Bolded** pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.

3 See www.hach.com for some of the test kits.

4 If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.

5 Only if special handling requirements are required in the Standard Special Provisions for aerial deposited lead.

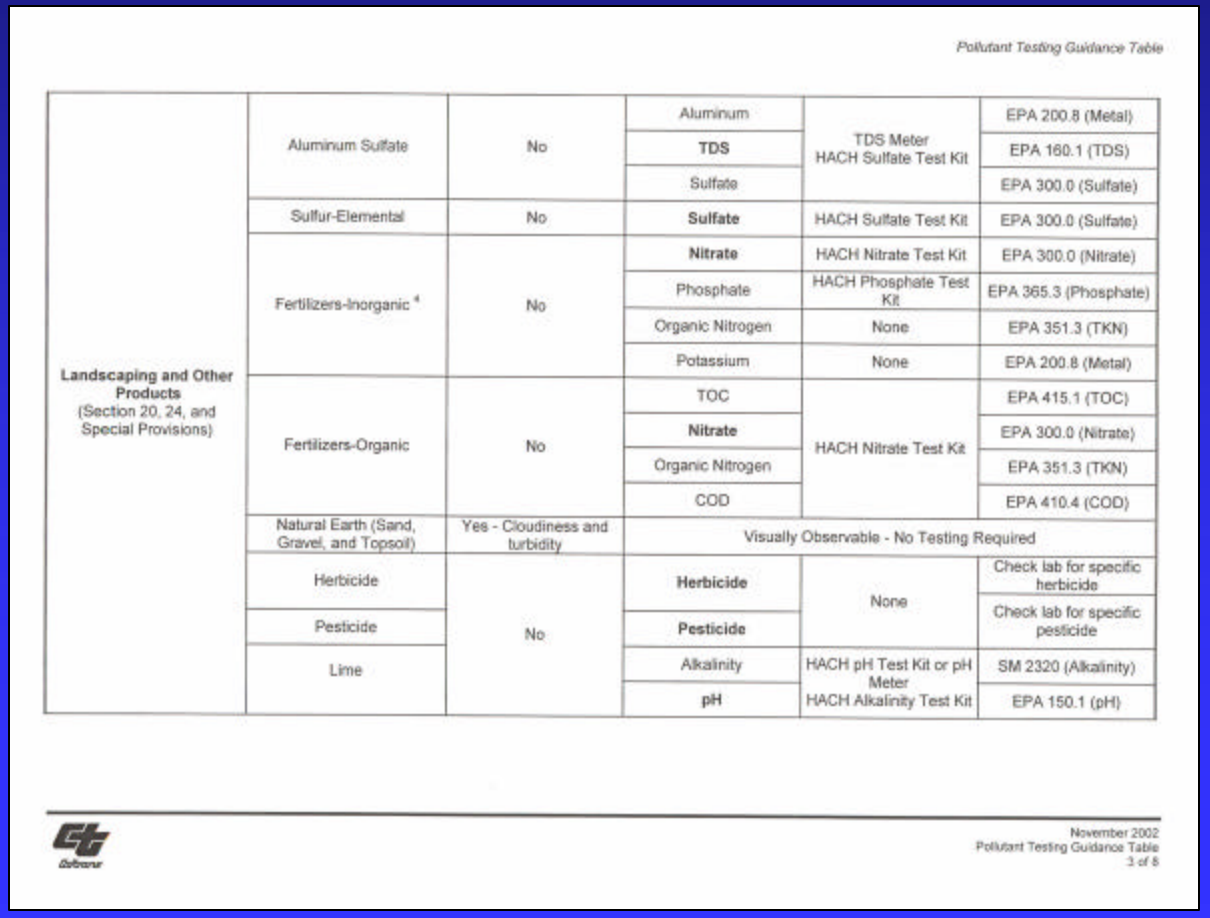
6 If used with a dye or fiber matrix, it is considered visually observable and no testing is required.

7 Based upon research conducted by Caltrans, the following copolymers/polymers do not discharge pollutants and no water quality sampling and analysis is **not** required: Super Tak™, M-Binder™, Fisch Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

Pollutant Testing Guidance Tables

Portland Concrete Cement & Masonry Products (Section 27, 28, 29, 40, 41, 42, 49, 50, 51, 53, 63, 65, 72, 73, 80, 81, 83, 90, and Special Provisions)	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	**pH**	HACH pH Test Kit or pH Meter	EPA 150.1 (pH)
			Alkalinity	HACH Alkalinity Test Kit	SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	**Methyl Methacrylate**	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste Ash	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	HACH Calcium Test Kit	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	HACH Acidity Test Kit or pH Meter HACH Alkalinity Test Kit	SM 2310B (Acidity)
			Alkalinity		SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625

Pollutant Testing Guidance Tables-



Pollutant Testing Guidance Table

Landscaping and Other Products (Section 20, 24, and Special Provisions)	Aluminum Sulfate	No	Aluminum	TDS Meter HACH Sulfate Test Kit	EPA 200.8 (Metal)
			TDS		EPA 160.1 (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	**Sulfate**	HACH Sulfate Test Kit	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic [4]	No	**Nitrate**	HACH Nitrate Test Kit	EPA 300.0 (Nitrate)
			Phosphate	HACH Phosphate Test Kit	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	EPA 351.3 (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers-Organic	No	TOC	HACH Nitrate Test Kit	EPA 415.1 (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		EPA 351.3 (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required		
	Herbicide	No	**Herbicide**	None	Check lab for specific herbicide
	Pesticide		**Pesticide**		Check lab for specific pesticide
	Lime		Alkalinity	HACH pH Test Kit or pH Meter	SM 2320 (Alkalinity)
			pH	HACH Alkalinity Test Kit	EPA 150.1 (pH)

Non-Visible Pollutants

- **Sampling and Analysis required if…**
  - Within two hours after discharge occurs, one of the following occurs:
    - Construction material, wastes, and activities are not stored under watertight conditions
    - Applicable BMPs are not properly implemented
    - The construction site historically was used as a site that may have had non-visible pollutants on it
    - Soil amendments or soil stabilizers have been previously applied

Non-Visible Pollutants

- **You don't have to sample if…..**
  - Spilled materials or waste are completely removed prior to a rain event
    - Including contaminated soil
  - Materials and wastes are properly stored (in a watertight condition), disposed of or incorporated into the work prior to a rain event

Quick Fact Review

- **What non-visible pollutants does the contractor sample or analyze for?**

A table of typical construction site pollutants is now included in the SWPPP/WPCP Preparation Manual Appendix A, Attachment S. It is also available on the web at http://www.dot.ca.gov/hq/construc/stormwater/swpppattach_july05 or

Non-Visible Pollutants

- **Sample Collection**
  - Sampling locations – per approved plan
    - Down gradient from discharge location, which drains the area of the observed breach, malfunction, leakage, spill, or suspected contamination
    - Uncontaminated up gradient background sample

Non-Visible Pollutants

- **Sample Collection**
  - First two hours of discharge
    - During daylight hours – sunrise to sunset
    - Seven days a week / year round including holidays
  - Personnel trained in water quality sampling procedures
    - Contractors staff or laboratory personnel

Non-Visible Pollutants

- **Sample Collection**
  - Sample analysis parameters include but not limited to
    - pH
    - Specific conductance
    - Dissolved oxygen
    - Conductivity
    - Salinity
    - Total Dissolved Solid (TDS)
    - Metals

Non-Visible Pollutants

- **Sample Collection**
  - Samples analyzed by a laboratory in accordance with 40 Code of Federal Regulations (CFR) Part 136
  - Field analysis by Contractor
    - Collection, analysis, and equipment calibration in accordance with manufacturer's specifications

Non-Visible Pollutants

- **Non-visible pollutants sample collection triggers**
  - Materials or waste containing non-visible pollutants are not stored under watertight conditions
  - By visual observation of any breach, malfunction, leak, or spill which may result in discharge of pollutants to surface waters or storm sewer system
    - Before or during rain events

Non-Visible Pollutants

- **Non-visible pollutants sample collection triggers**
  - Construction activities such as application of fertilizer, pesticide, herbicide, methyl methacrylate concrete sealant, or non-pigmented curing compound have occurred during a rain event or within 24 hours preceding a rain event, and there is the potential for discharge of pollutants to surface waters or drainage system.

Non-Visible Pollutants

- **Non-visible pollutants sample collection triggers**
  - Project use of soil amendments with the potential to elevate pH level
  - Pre-existing contaminated sites

Non-Visible Sampling Triggers

Assume:

- Discharge off the R of W and into waters of the US has occurred for 40 minutes
- Stockpile is cold mix asphalt on the R of W
- Gutter is active and drains off the R of W
- Project has a SWPPP

NO…this is a visible pollutant…refer to Pollutant Guidance Table

What should be done?

Non-Visible Sampling Triggers

- Assume:
  - Rain event forecasted
  - Project has a SWPPP
  - Project has the potential to discharge to waters of the US

Will sampling be required ?

No…materials are stored in a watertight condition

Non-Visible Sampling Triggers

Will sampling be required ?

- Assume:
  - Discharge off the R of W and into waters of the US has occurred for 20 minutes
  - Slope was stabilized with a copolymer
  - Project has a SWPPP

Yes….let’s refer to Pollutant Guidance Table

Non-Visible Sampling Triggers

Where will the sample be collected?

Upgradient of discharge

Downgradient of discharge

Quick Fact Review

- **For Non-visible pollutants, when does the contractor sample?**

Non-Visible Pollutants

- **Sample Documentation**
  - Water quality sample analytical results and Quality Assurance / Quality Control (QA/QC) Data
    - Submitted to Resident Engineer
      - 5 days for field analysis
      - 30 days for laboratory
    - Evaluation of results
    - Filed with SWPPP document
    - Category 20

Evaluation of Results

- **Data Evaluation**
  - The contractor will submit an evaluation of the water quality sample analytical results, including figures with sample locations and QA/QC data for every sampling event.
  - Should downgradient samples exceed upgradient or background levels, the WPCM will evaluate:
    - BMPs
    - Site Conditions
    - Surrounding influences/other site factors

Evaluation of Results

- **Data Evaluation**
  - Contractor will determine probable cause for the increase in levels downgradient
  - Appropriate BMPs will be repaired or modified to mitigate increases/discharges
  - Any revisions to the BMPs will be recorded as an amendment to the SWPPP

Reporting of Results

- **Sampling Data Reporting Form**
  - SWPPP Preparation Manual Appendix A, Attachment T
  - Contractor to use form to electronically submit data to the RE or other person designated by Caltrans
  - Contractor to sign and certify all data reporting forms

Quick Fact Review

- **What are Non-visible pollutants?**

Quick Fact Review

- **Is Sampling and Analysis required for acids, sealants, and solvents?**

Non-Visible Sampling Triggers

- **Assume:**
  - Discharge off the R of W has occurred for 90 minutes
  - Five gallon buckets contain cleaning and petroleum products
  - Hoppers contain masonry products
  - Swale drains off the R of W

Yes….let's refer to Pollutant Guidance Table

What should be done?

Non-Visible Sampling Triggers

Where should samples be taken ?

Upgradient of discharge

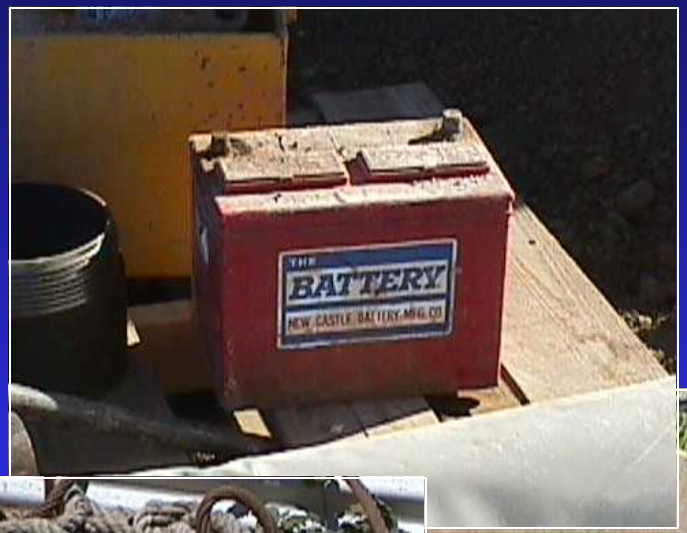
Downgradient of discharge

Non-Visible Sampling Triggers

Will sampling be required ?

- Assume:
  - Rain event forecasted

Yes…unless prior to rain event materials are stored in a watertight condition



Quick Fact Review

- **For Non-visible pollutants, where does the contractor collect samples?**

Non-Visible Pollutants

- **What if**
  - Data shows an increase in the pollutant
  - What should the contractor do ?
    - Identify the source of the pollutant
    - Clean up spills
    - Repair or replace any BMP that has failed
    - Maintain any BMP that is not functioning properly due to lack of maintenance
    - Evaluate whether any additional or alternative BMPs should be implement
    - Resample during next rain event
    - Notify RE

Non-Visible Pollutants

- **Possible solutions**
  - Place materials or waste in watertight containment, under a watertight roof, or indoors
  - Cleanup and/or contain spills or leaks
  - Contain runoff onsite
  - Avoid applying materials prior to a known rain event
  - Maintain non-storm water and waste material control BMPs
  - Install additional BMPs, if necessary

Non-Visible Pollutants

- **Who Pays for Sampling and Analysis for non-visible pollutants**
  - **Caltrans** pays by Extra Work at Force Account
    - Soil amendments or stabilizers
    - Run-on
    - Historical contamination

Non-Visible Pollutants

- **Who Pays for Sampling and Analysis for non-visible pollutants**
  - **Contractor** if there are
    - Spills / leaks / breaches / malfunctioning
    - Improperly implemented BMPs
    - Lack of maintenance or repairs of BMPs
    - Lack of BMPs
    - Poorly scheduled work

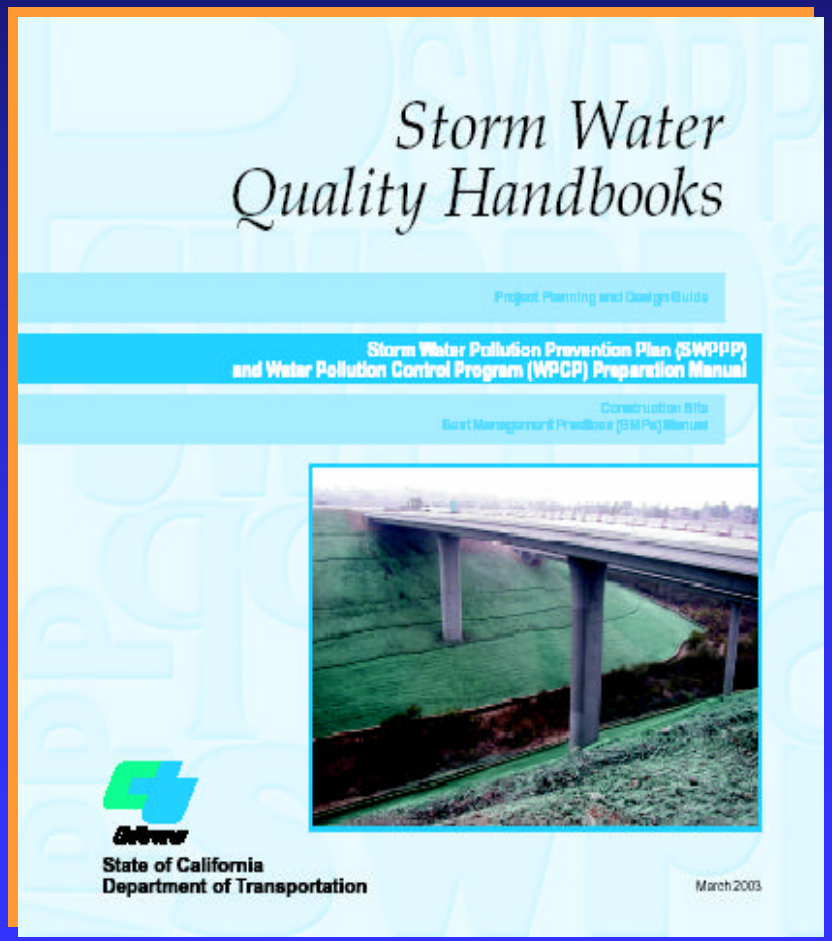
- **Course Highlights**
  - Introduction
  - NPDES Permit Requirements
  - Caltrans Requirements
    - Construction Procedure Directive – CPD
    - Caltrans Special Provisions and Handbooks
  - 303(d) Sedimentation / Siltation or Turbidity
  - Non-Visible Pollutants
  - **Sampling and Analysis Plan Review Guidelines**
  - Contractor Sample Collection Procedures
  - Inspection Tips

SAP Review Guidelines

Sampling and Analysis Templates Online as part of the SWPPP template (2005 version)

SAP Review Guidelines

Revised SWPPP Preparation Manual



SAP Review Guidelines

How is the Template set up?

INSTRUCTIONS .....Telling the contractor what is necessary in that section

REQUIRED TEXT .....Telling the contractor exactly what verbiage to use in the document

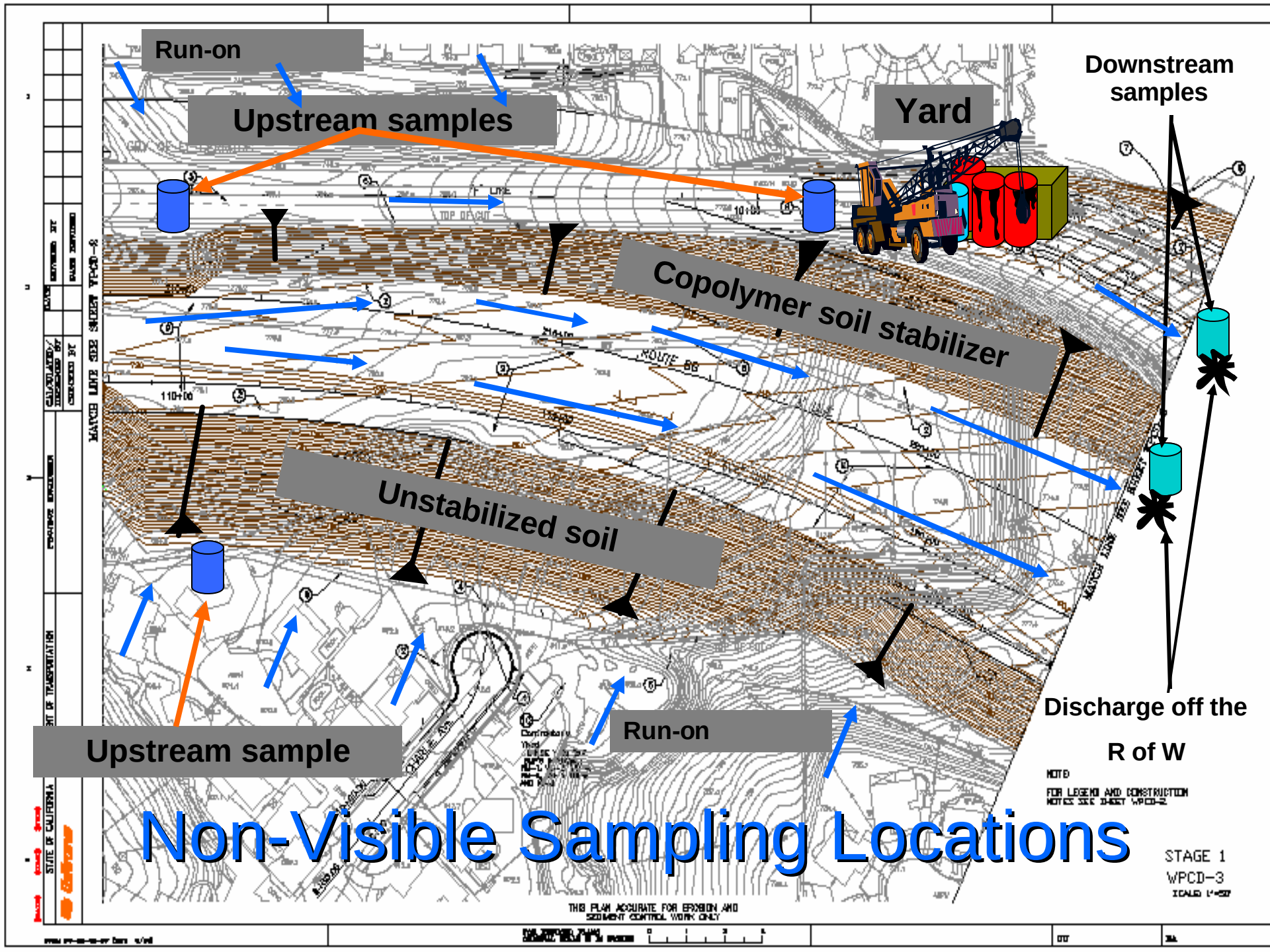
EXAMPLES .....Showing the contractor what the section might include

SAP Review Guidelines

- **SWPPP Sampling and Analysis Plan Review**
  - 600.4 Sediment
  - 600.5 Non-visible

SAP Review Guidelines

- **Water Pollution Control Drawings (WPCD)**
  - Show sampling locations


Run-on
Upstream samples
Yard
Downstream samples
Copolymer soil stabilizer
Unstabilized soil
Upstream sample
Run-on
Discharge off the R of W
Non-Visible Sampling Locations
STAGE 1
WPCD-3

- **Course Highlights**
  - Introduction
  - NPDES Permit Requirements
  - Caltrans Requirements
    - Construction Procedure Directive – CPD
    - Caltrans Special Provisions and Handbooks
  - 303(d) Sedimentation / Siltation or Turbidity
  - Non-visible Pollutants
  - Sampling and Analysis Plan Review Guidelines
  - **Contractor Sample Collection Procedures**
  - Inspection Tips

Contractor Sample Collection Procedures

- **Section highlights**
  - Sampling procedures
  - Documentation
  - Data Evaluation and Reporting

Sampling Procedures

- **Monitoring supplies**
  - Sample collection equipment
    - Scoops / bailers / field meters
  - Sampling bottles
  - Resealable storage bags / gloves / paper towels
  - Ice chest or cooler
    - Ice, “Blue Ice”

Sampling Procedures

- **Monitoring supplies continued**
  - Sample identification labels
  - Sample activity log forms
  - Chain-of-Custody forms (COC)
  - Rain gear

Sampling Procedures

- **Preparations**
  - Inspect general condition of site
    - Note any unsafe areas
    - Think safety first
  - Locate sampling points
  - Complete field forms
  - Complete sampling bottle labels

Sampling Procedures

- **Collection Device Decontamination**
  - Decontaminate sampling equipment
    - If not using clean equipment, the Contractor should decontaminate by washing equipment using Tri-Sodium Phosphate detergent
    - Decontamination Procedure
      - Soapy water wash,
      - Distilled water rinse, and
      - Final rinse with distilled water

Sampling Procedures

- **Reduce potential contamination of samples by:**
  - Donning a pair of latex or nitrile gloves prior to the collection and handling of each sample at each location
  - Not contaminating the inside of the sample bottle by allowing it to come in contact with any material other than the water sample
  - Discarding sample bottles or lids that have dropped onto the ground

Sampling Procedures

- **Reduce potential contamination of samples by:**
  - Not allowing falling or dripping rain water to enter sample collection containers or sample bottles
  - Not allowing sample preservatives to spill out of sample bottles
  - Not eating, drinking, or smoking during sample collection

Sampling Procedures

- **Sample Collection**
  - Once sufficient flow is observed collect sample
  - Pour collected water into sampling bottle
  - Tightly cap bottle
  - Complete labels and apply to bottles

Sampling Procedures

- **Sample Collection (continued)**
  - Collect upgradient sample first
  - Collect sample upgradient from where sampler is standing
  - Prevent sampling device from touching soil

Sampling Procedures

- **Sample Labeling**
  - Project name
  - Project number
  - Sample identification number and location
  - Collection date/time
  - Analytical parameter
  - Sampler's initials

Sampling Procedures

- **Sample Packaging**
  - Seal bottles in plastic bags
  - Place into ice chest or cooler
  - Pack ice around each sample
  - Seal storage container
  - Complete Chain of Custody form

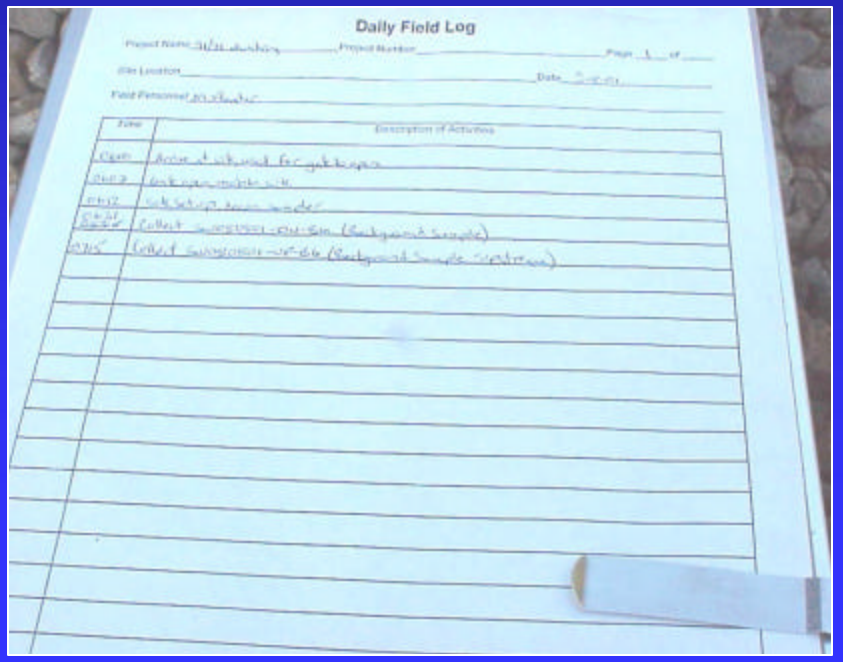
Sampling Procedures

- **Field Analysis**
  - Conductivity
  - pH
  - Turbidity
  - Total Dissolved solids

- **All field equipment should be calibrated per manufactures specifications**
- **Sample from separate container**
- **Note analytical result**

Sampling Procedures

- **Sample Documentation**
  - Sample activity log
  - Chain of Custody forms

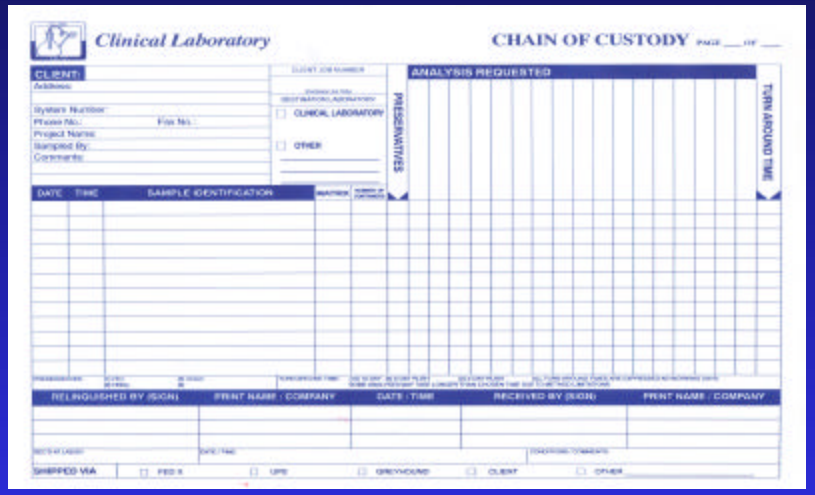


Sampling Procedures

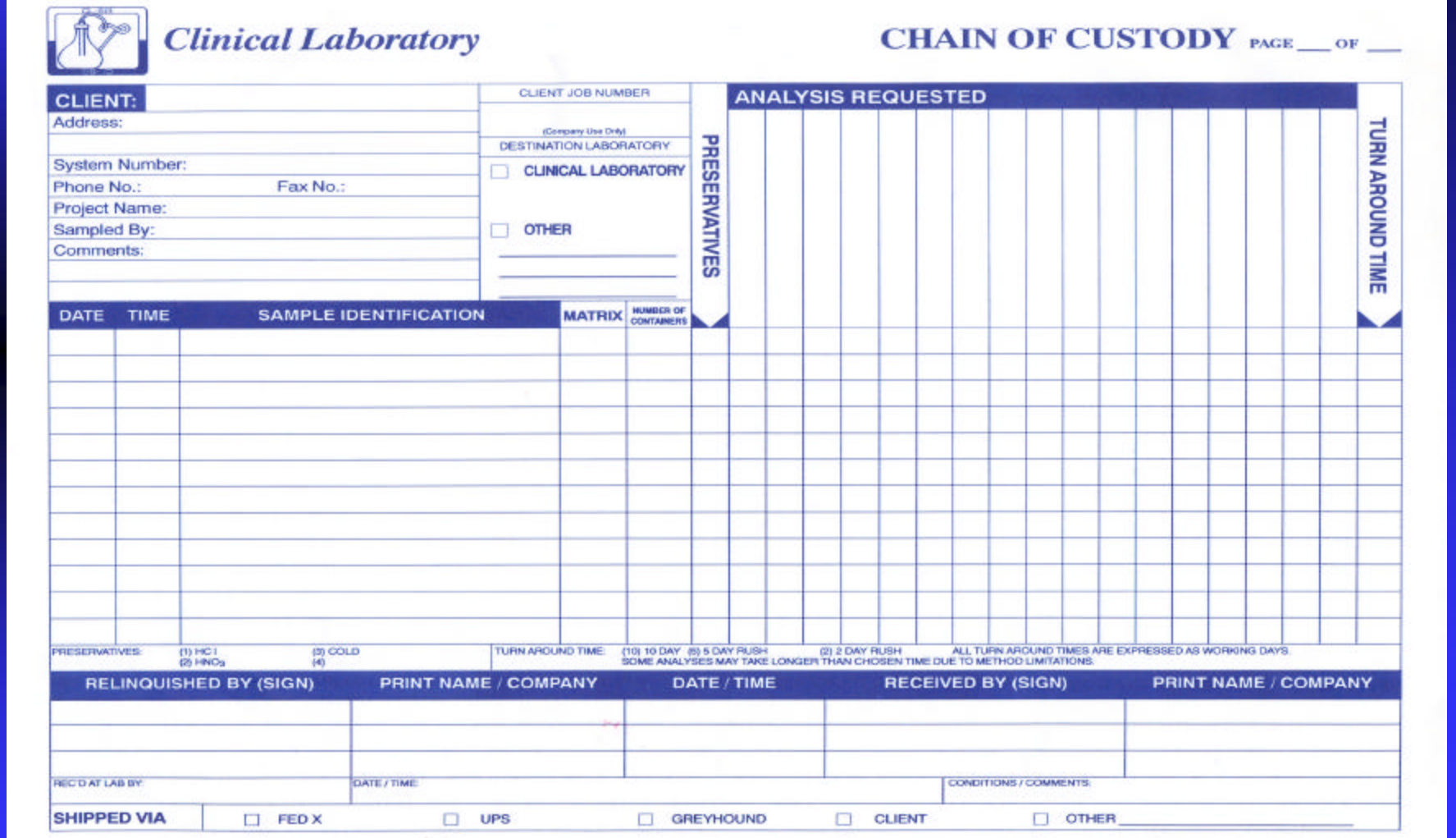
- **Sample Documentation (continued)**
  - **Sample activity log**
    - **Date**
    - **Sampling time**
    - **Site location**
    - **Analytical constituent**
    - **Name of sampling personnel**
    - **Weather conditions**
    - **Field analysis result**
    - **Other pertinent information**

Sampling Procedures

- **Chain of Custody (COC)**
  - Date
  - Sampling time
  - Site location
  - Analytical constituent
  - Name of sampling personnel
  - Lab's signature



Sampling Procedures



Clinical Laboratory

CHAIN OF CUSTODY PAGE ___ OF ___

CLIENT:
Address:
System Number:
Phone No.: Fax No.:
Project Name:
Sampled By:
Comments:

CLIENT JOB NUMBER
(Company Use Only)
DESTINATION LABORATORY
☐ CLINICAL LABORATORY
☐ OTHER

PRESERVATIVES

ANALYSIS REQUESTED

TURN AROUND TIME

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	NUMBER OF CONTAINERS

PRESERVATIVES: (1) HCl (2) HNO_3 (3) COLD (4)

TURN AROUND TIME: (10) 10 DAY (5) 5 DAY RUSH (2) 2 DAY RUSH
ALL TURN AROUND TIMES ARE EXPRESSED AS WORKING DAYS.
SOME ANALYSES MAY TAKE LONGER THAN CHOSEN TIME DUE TO METHOD LIMITATIONS.

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY

REC'D AT LAB BY: DATE / TIME: CONDITIONS / COMMENTS:

SHIPPED VIA ☐ FED X ☐ UPS ☐ GREYHOUND ☐ CLIENT ☐ OTHER ___

Data Management

- **Sample event and sampling procedures data management**
  - Site inspection form
  - Field analysis results
  - Analytical results
  - Keep data in SWPPP document
  - Submit all results to the R.E. within 5 days of sampling for field analyses and 30 day for laboratory analysis

- **Course Highlights**
  - Introduction
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  - Sampling and Analysis Plan Review Guidelines
  - Contractor Sample Collection Procedures
  - **Inspection Tips**

Inspection Tips

Sedimentation / Siltation or Turbidity

- **Monitor weather reports**
- **When to Inspect BMPs**
  - Prior to a storm event
  - Every 24 hours during extended storm events
  - After storm event
- **Identify site conditions**
- **If applicable notify RE and contractor**
- **Sampling by contractor is mandatory**

Inspection Tips

Non-Visible Pollutants

- **Monitor weather reports**
- **When to Inspect**
  - Prior to a storm event
  - Every 24 hours during extended storm events
  - After storm events
- **Identify site conditions**
  - Spills, leaks, Malfunction or breaches of BMPs

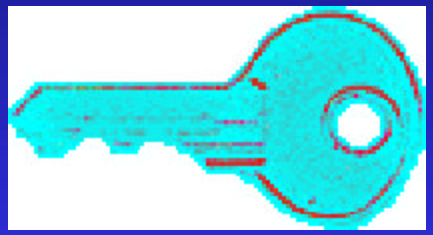
Inspection Tips

Non-Visible Pollutants, continued

- Contractor to institute correction procedures
- If applicable notify contractor and RE
- Contractor to sample if pollutants are not covered, contained or disposed of properly

Inspection Tips

- **Make sure potential non-visible pollutants are:**
  - **Cleaned-up**
  - **Covered**
  - **Contained**



- **C^3**

Inspection Tips

- **Inspection Checklist**
  - Revised Storm Water Quality Inspection Checklist available in 2003 version of SWPPP Preparation Manual and 2005 SWPPP Template
  - http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm

Sampling Cost

Approximate cost as of January 2005

VOCs - Volatile Organic Compounds	$150.00
SVOCs – Semi-Volatile Organic Compounds	$250.00
Pesticides	$100.00
Herbicides	$150.00
BOD – Biological Oxygen Demand	$40.00
DO - Dissolved Oxygen	$13.00
pH	$5.00
Alkalinity	$22.00
Metals	$12/Metal
Metals (Chromium Vl)	$30.00

Closing Comments

- **What we learned**
  - What the pollutants of concern are
    - How they can harm the environment
  - The requirements of Resolution 2001-046
  - Caltrans Requirements
    - Construction Procedure Directive – CPD
    - Caltrans Special Provision
  - How to use the Pollutant Testing Guidance Table
  - How to review a SAP
  - An overview of how to sample storm water runoff

Closing Comments

- **Please take these final thoughts with you**
  - Document sampling activities
  - **C^3**
    - **C**over pollutants and waste
    - **C**ontain pollutants and waste
    - **C**lean up spills and leaks
  - Inspect regularly
  - Properly schedule work activities
  - Monitor and maintain all BMPs
  - Communicate with contractor's personnel

Information

- **Online Information/Documents**
  - General Construction Permit
    - http://www.swrcb.ca.gov/stormwtr/construction.html
    - The permit has been updated to include the 2001 and 2003 modifications
  - Caltrans NPDES Permit
    - http://www.swrcb.ca.gov/stormwtr/caltrans.html
  - State Water Resources Control Board
    - http://www.waterboards.ca.gov/stormwtr/index.html

Information

- **Online Information/Documents**
  - Construction Site Storm Water Quality Sampling: Guidance Manual
    - http://www.dot.ca.gov/hq/construc/stormwater/SamplingGuidanceManual.pdf
  - Storm Water Quality Handbooks
    - http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm
  - List of State Certified Laboratories
    - http://www.dhs.ca.gov/ps/ls/ELAP/html/lablist.htm

Assistance / Contacts

- **Caltrans**
  - Construction Storm Water Coordinator
  - Your Resident Engineer